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**OHIO EPA COMMENTS O.U. 5 TREATABILITY
STUDY WORK PLAN**

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**5
ENCLOSURE
OU5**

O. U. 5 TREATABILITY STUDY WORK PLAN

GENERAL COMMENTS

1. Sampling and analyses performed for the treatability study must be conducted according to the approved QAPP.
2. Provide a text summary, list of samples, and location map for all samples that will be included in the treatability study.
3. DOE must include analyses for all waste forms resulting from the treatment process, including both liquid and solid wastes. Additionally, the final disposition of these waste forms should be discussed.
4. The portion of Operable Unit 5 designated for soil washing would have to be cleared, scalped, and then excavated to a depth of several feet, yielding an enormous quantity of excavated material that will be widely heterogeneous. Particle size separation and classification as envisioned by the work plan will be unreasonably costly unless an offsetting cost-benefit can be achieved by reducing the volume of soil which must be subjected to soil washing.
5. Unless a cost-benefit justification for the proposed particle size separation can be made, a coarser study should be conducted initially to determine if the remedial objectives can be met at much less cost using standard, commercial technology. Such a simplified treatment process is outlined below.
 - All excavated material should be separated into >10 mm and <10 mm size fractions. During the treatability study, analysis should be conducted to verify that the >10 mm fraction is "clean". Separation and treatment of the <10 mm fraction in further divisions is probably not cost-effective.
 - The <10 mm fraction should be digested with HCl to solubilize all metals and radionuclides. This is a standard commercial operation in rare earth processing plants where thorium and uranium are constantly removed.
 - The acidified slurry should be subjected to gravity separation and the resultant sludge should be washed with the rinse re-introduced to the gravity separation system. The sludge (settled material) should be roasted and used to refill the site.
 - The effluent from the gravity separator should be neutralized and then steam-stripped to remove VOCs and

semi-VOCs. The overhead should be condensed, then carbon-filtered, and the aqueous phase should be returned to the digestion system.

- The steam stripper bottoms should be subjected to selective ion exchange (IX) to remove the metals, etc. Treated effluent water should be returned to the digestion system. IX regenerant solutions may be processed to recover valuable metals or the metals may be precipitated, encapsulated, and then placed in a secure landfill onsite or offsite.
6. It is unclear what, if any, attempt has been made to entice treatment system and resin manufacturers to provide free research, design, and treatability services with the incentive of demonstrating the effectiveness of their products.

SPECIFIC COMMENTS

1. Section 1.1.1, pg. 1, lines 29-30: The plan should state that options were identified during the first initial screening of alternatives, and that another "initial" screening of alternatives is being prepared because of the changes in operable unit definitions.
2. Section 1, pg. 3, line 20: How will the results from the Integrated Demonstration and the OU 5 Soil Washing Treatability Study be coordinated? The report discusses sampling but does not mention results so that information is not omitted or duplicated.
3. Section 1, pg. 3, line 30: What is the basis for choosing 35 pCi/gm as an action level?
4. Section 1.2.3, pg. 5, lines 20-22: Define "high levels" of other contaminants.
5. Section 1.2.3, pg. 5, lines 26-27: The fire training area also has organic chemical contamination.
6. Table 1-1, pg. 8, footnote c: Describe the construction program.
7. Section 1, pg. 17, lines 3-6: Will total metal concentrations be determined at various steps in the process?
8. Section 2, pg. 1, lines 3-8: Ohio EPA understands that the goal of returning a significant volume of decontaminated soil to the site is important, but State of Ohio ARARs may designate this material as solid waste. This issue needs to be resolved and DOE may eventually need to submit a request for exemption to the Director of the Ohio EPA.
9. Section 2.1, pg. 1, lines 10-12: Explain the rationale for

this statement. Simple volume assessments will not necessarily determine the applicability of soil washing as a treatment method.

10. Section 3, pg. 1, lines 10-23: This is an excellent description of the risk levels and efforts to meet preliminary remediation goals (PRGs).
11. Section 3.0, Table 3-5, pg. 13: Give a method number and/or reference for uranium analysis by ion chromatography.
12. Section 3.2, pg. 9, line 22: It is stated that the establishment of DQOs is the part of the process that defines the data quality needs of the project. The process should work in the opposite fashion. The DQOs are determined by the intended uses of the data or data needs. Please revise this sentence.
13. Table 3-4, pg. 12, and Table 3-6, pg. 14, Required Detection Limits: Provide a brief synopsis of section 4.0 of the QAPP, possibly as an appendix.
14. Section 4.0, pg. 1, lines 2-3: Mixed waste has a specific regulatory definition - a waste which contains both a radioactive component subject to the Atomic Energy Act and a hazardous component that is either listed as a hazardous waste in Subpart D of 40 CFR Part 261 or exhibits any of the hazardous characteristics identified in Subpart C of 40 CFR Part 261. If the treatability study work plan intends for materials referred to as "mixed waste" to have a different meaning, mixed waste should be defined in the plan for purposes of the treatability study.
15. Section 4.0, pg. 1, lines 8-9: Soils chosen for soil washing should also be selected to represent soil types at the site, e.g., Henshaw soil, Fincastle soil, construction borrow soil, etc. Locations that are representative of the contaminants at the site may not be representative of the majority of the types of soils that are contaminated.
16. Section 4.0, pg. 1, lines 16-18: Physical and chemical characterization of soils must be included in the experimental design and procedures.
17. Section 4.2.1, pg. 3, lines 12-15: What are the "as received" samples? Describe the samples that will be used for Stage 1 of the study. Because this work plan attempts to use several different sampling plans and previously collected samples, this wording is particularly confusing.
18. Section 4.2.1, pg. 3, lines 32-33: Describe which samples will be used for this determination and the rationale for their selection.

19. Section 4.2.2, pg. 4, lines 30-32: The characterization will determine the type and amount of contaminants associated with particle-size fractions after washing, not as collected from the four locations.
20. Section 4.2.3, pg. 6, line 17: Explain the rationale for conducting the Stage 1 chemical extraction at elevated temperatures. A previous U.S. EPA study indicated that no significant benefit was observed as compared to tests conducted at ambient temperatures (Hazardous Waste Consultant, 1991).
21. Section 4.2.3, pg. 6, lines 18-19: How will the analyst determine that the extractants have decomposed?
22. Section 4.2.3, pg. 6, lines 25-26: If additional extractants need to be investigated, a list should be provided to U.S. EPA and Ohio EPA for approval.
23. Section 4.2.3, pg. 9, lines 2-4: In a previous U.S. EPA study, contaminant concentration in the less than 0.25 mm size fraction increased after washing. If chemical extraction and analysis in Stage 1 is performed using the entire sample (all size fractions), the results may be meaningless.
24. Section 4.3.3, pg. 16: Washing solutions are likely to contain other contaminants in addition to uranium. Explain the rationale for testing only for uranium. Define the concentration that will denote successful contaminant removal from washing solutions.
25. Section 4.4: The remedy selection testing must incorporate complete physical and chemical characterization of the soil before soil treatment begins.
26. Section 4.4.1, pg. 18, lines 21-22: Explain the rationale for assuming that the size of contaminated particles is less than 75 microns.
27. Section 4.4.1, pg. 18, second para.: The use of "clean" in this paragraph is confusing. Clarify its use.
28. Section 4.5, pg. 22, line 7: When is data about concentration of target organic compounds associated with each particle-size fraction acquired during the treatability study?
29. Section 6: The use of two programs with similar titles, "Soil washing treatability study work plan" and "Uranium soils integrated demonstration treatability sampling plan" in the work plan is confusing and requires very careful reading by reviewers. For example, Figure 6-1 is titled, "Treatability soil sampling locations" and is referenced in the text by both programs. A review of this section for clarity would be helpful.

30. Section 6.0, pg. 1, lines 11-13: This statement should be included in the objectives in Section 3, pg. 9.
31. Section 6.1, pg. 2, lines 11-15: In order for the results from the treatability study to be comparable, all samples must be collected and analyzed using the same methods and procedures. DOE must clearly demonstrate that the sampling and analysis plan for the treatability study is the same as the sampling and analysis plan for the integrated demonstration project. In Appendix E the site media sampling plan appears to have different objectives and protocol than the integrated demonstration project as described in Section 4 and 6. Describe how the plan in Appendix E is related to the other sampling plans.
32. Section 6.2, pg. 4, lines 11-13: Action levels have not been defined in this section. Explain the action level of 35 pCi/g.
33. Section 6.2, pg. 4, lines 26-27: This sentence is not logical as written. Correct any typographical errors.
34. Section 6.3, pg. 6, lines 3-4: Correlate the locations with a numbered sample location in Figure 6-1.
35. Section 6.5, pg. 10, lines 2-3: The use of a rototiller to loosen surface soil does not seem to be a likely soil excavation technique that would be used during remediation. Although volatile organic compounds may be lost during soil excavation, more losses would occur by rototilling the soil. An alternative method of soil excavation should be considered.
36. Section 10.1, pg. 1: At the present time, the FEMP does not have any permitted units that are accepting RCRA or CERCLA wastes for disposal. Revise this section to reflect the current status of the FEMP.

REFERENCES

The Hazardous Waste Consultant, 1991, "Contaminated soil - Regulatory issues and treatment technologies," The Hazardous Waste Consultant, September/October, 1991, pp. 4.1-4.24.